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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,100	11/01/2000	John M. Pinneo	P1-007	9615

7590 05/29/2002

Kenneth D'Alessandro
Sierra Patent Club
P O Box 6149
Stateline, NV 89449

EXAMINER
VO, HAI

ART UNIT	PAPER NUMBER
1771	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/708,100	PINNEO ET AL.	
	Examiner	Art Unit	
	Hai Vo	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) *12-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-11, drawn to an article, classified in class 428, subclass 304.4+.

   II. Claims 12-27, drawn to a method for forming a porous diamond article, classified in class 427 subclass various.

2. The inventions are distinct, each from the other because of the following reasons: Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process such as sputtering or casting.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Andrew Gathy on 01/05/02 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-27 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Herb et al (US 5,361,842). Herb discloses an article comprising diamond deposited on a framework material substrate wherein each of the substrate particles has first surface regions in contact with intermediately adjacent other ones of the particles and second surface regions spaced apart from the immediately adjacent ones of particles to define boundaries of inter-particle voids between the intermediately adjacent ones of the particles (abstract). Herb also teaches the inter-particle voids are not completely filled with a diamond material (claim 8). It is the examiner's position that such a substrate framework is inherently having a

porosity sufficient to permit the flow of fluids in at least one direction through the material. With regard to claim 3, Herb discloses the substrate being a stainless steel (column 6, line 65), which can be coated with a layer of a second material (column 7, lines 65-68). With regard to claim 4, Herb discloses the diamond having a thickness of 25 microns (column 10, line 10). With regard to claim 5, Herb discloses the diamond substantially having no voids (column 9, line 7). Herb anticipates the claimed subject matter.

7. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Saito et al (US 6,361,857). Saito discloses a heat sink comprising a thin diamond film formed on a porous substrate (column 6, lines 24-32). Since the porosity of the porous body is at least 15% by volume and not more than 60% by volume (column 6, lines 59-60), the substrate is inherently expected to have porosity sufficient to permit the flow of fluids in at least one direction through the material. With regard to claim 3, figure 17 of Saito shows that an intermediate SiC layer **32** disposed between the diamond film layer **31** and a porous substrate **26**. With regard to claim 4, Saito discloses the diamond having a thickness of 24 microns (column 10, line 66). With regard to claim 5, Saito discloses the diamond film layer having uniform thickness (column 8, line 37). Saito anticipates the claimed subject matter.

8. Claims 1, 2, 6 and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Ozmat (US 6,196,307). Ozmat discloses a heat exchanger comprising a metallic foam being deposited with CVD diamond (column 4, lines 25-27). The metallic

foam has a network of ligaments which form numerous open cells (column 3, lines 5-7). The porosity of the foam is sufficient to permit continuous flow of fluid coolant (column 4, lines 16-18). Ozmat discloses the metal foam being copper, silver foams (column 4, line 25). Ozmat anticipates the claimed subject matter.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 3-5, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat (US 6,196,307) as applied to claims 1 and 6, in view of Saito et al (US 6,361,857) or Herb et al (US 5,316,842). Ozmat does not disclose an intermediate layer between the substrate and diamond film. Figure 17 of Saito shows that an intermediate SiC layer **32** disposed between the diamond film layer **31** and a porous substrate **26**. Herb discloses the substrate being coated with a layer of a second material (column 7, lines 65-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have included an intermediate layer between the substrate and the diamond layer motivated by the desire to improve the adherence between the substrate and the diamond layer.

With regard to claims 4 and 9, Ozmat is silent as to a thickness of the diamond and surface roughness of the diamond. Saito teaches the diamond having a

thickness of 24 microns (column 10, line 66). Herb discloses the diamond having a thickness of 25 microns (column 10, line 10). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have altered the thickness range of the diamond layer since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. ***In re Aller***, 105 USPQ 233. It would have been obvious to the skilled artisian to have optimized the thickness range of the diamond layer motivated by the desire to economize the cost of the production and increase the adherence between the thin diamond layer and the substrate with the warping reduced.

With regard to claims 5 and 10, since the heat exchanger of Ozmat as modified by Saito or Herb is made of the same material and structurally the same as the presently claimed article i.e., both articles comprising diamond deposited on a porous substrate. It is the examiner's position that the coalescence of the diamond film would have been inherently present in the heat exchanger of Ozmat as modified by Saito.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat (US 6,196,307). Ozmat discloses a heat exchanger wherein the foam having between 5 to 100 voids per inch (claim 29). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have altered the void distribution of the foam since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or

workable ranges involves only routine skill in the art. ***In re Aller***, 105 USPQ 233. It would have been obvious to the skilled artisian to have optimized the void distribution of the foam motivated by the desire to control the degree of porosity of the foam.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (703) 605-4426. The examiner can normally be reached on Monday to Friday, 8:30 to 5:00 (EAST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (703) 308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

TERREL MORRIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

HV
May 20, 2002